TABLE CS-4
Second Hand Store ACM Removal, Demolition and Reconstruction

COST ESTIMATE SUMMARY

Site: Libby Asbestos
Location: Libby, Montana
Date: April 29, 2003

Description: Removal of ACM. Containment, storage, transportation and disposal of ACM materials, demolition and reconstruction of The Second Hand Store.

CAPITAL COSTS:

DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL	NOTES	REFERENCE
ACM Personal Protective Equipment (PPE)	1	LS	$ 4,792	$ 4,792	Based on duration of VCI and ACM removal	CW3-1
Portable Decontamination Facility	1	EA	$ 1,345	$ 1,345		CW3-2
Containment System and Set-up	1	LS	$ 12,154	$ 12,154	Based on building size	CW3-3
VCI Bulk Removal	1	LS	$ 15,932	$ 15,932	Based on size of the walls contaminated with VCI	CW3-4
Asbestos-Contaminated Soil Removal	1	LS	$ 183	$ 183	Based on soil contaminated volume	CW3-5
Transportation and Disposal	1	LS	$ 10,800	$ 10,800	Based on the volume of VCI and ACM	CW3-6
Demolition PPE	1	LS	$ 1,297	$ 1,297		CW3-7
Building Demolition	1	LS	$ 31,658	$ 31,658	Based on approx. size of building	CW3-8
Site Restoration	1	LS	$ 3,523	$ 3,523		CW3-9
Building Construction	1	LS	$ 299,045	$ 299,045	Based on approx. size of building	CW3-10
Site Breakdown	1	LS	$ 4,985	$ 4,985		CW3-11
Replace Inventory	1	LS	$ 6,210	$ 6,210	Value to be assessed	CW3-12
SUBTOTAL				$ 391,924		
TOTAL CAPITAL COST				$ 391,924		

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TABLE CW3-1

Capital Cost Sub-Element
ACM Personal Protective Equipment

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/28/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes Personal Protective Equipment (PPE) and two-way communication radios needed for the duration of VCI bulk removal and asbestos contaminated soil removal. Disposable items are used at a rate of 2 per crew member per day.

Cost Analysis:
Personal Protective Equipment and Respirators (8 days)

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC		CITATION	COMMENTS
Communications																				
Two-Way Radios	9	EA	1.00	$0.00	$0.00	$0.00	$0.00	$60.00	$0.00	$60.00	$540.00	1.04	1.13	$631.80	15%	8%	$785	E	33-01-0420	
Level C PPE																				
Disposable Coveralls (tyvek/polycoated)	84	EA	1.00	$0.00	$0.00	$0.00	$0.00	$5.89	$0.00	$5.89	$494.76	1.04	1.13	$578.87	15%	8%	$719	E	33-01-0424	
Disposable Boot Cover (Tyvek)	84	EA	1.00	$0.00	$0.00	$0.00	$0.00	$1.13	$0.00	$1.13	$94.92	1.04	1.13	$111.08	15%	8%	$138	E	33-01-0421	
Half-Face Respirator	7	EA	1.00	$0.00	$0.00	$0.00	$0.00	$49.62	$0.00	$49.62	$347.34	1.04	1.13	$408.39	15%	8%	$505	E	33-01-0435	
Cartridges	84	EA	1.00	$0.00	$0.00	$0.00	$0.00	$20.94	$0.00	$20.94	$1,758.96	1.04	1.13	$2,067.96	15%	8%	$2,558	E	33-01-0435	
Disposable Gloves, latex, pair	84	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.21	$0.00	$0.21	$17.64	1.03	1.13	$20.46	15%	8%	$25	R	33-01-0423	
Safety goggles, reusable	7	EA	1.00	$0.00	$0.00	$0.00	$0.00	$8.38	$0.00	$8.38	$44.66	1.03	1.13	$51.81	15%	8%	$64	R	33-01-0427	
														TOTAL UNIT COST:			$4,792			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
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Escalation indices are from Exhibit B-1 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, and http://www.enr.com/features/conEco/costIndexes/default.asp
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:
O - ECHOS Unit Cost Book 1998, E - ECHOS Unit Cost Book 2000; C - Means CostWorks 2000; F - Means Fac. Constr. Cost Data 1998; R - Means Environmental Remediation Cost Data 2001
P - Based on Previous Work by CDM Federal, V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 8% is used for the Prime Contractor.

Abbreviations:

QTY	quantity
EA	each
EQUIP	equipment
MATL	material
HPF	HTRW productivity factor
ADJ LABOR	adjusted labor for HPF
ADJ EQUIP	adjusted equipment for HPF
UNMOD UC	unmodified unit cost
UNMOD LIC	unmodified line item cost
EF	escalation factor
AF	area factor
UNBUR LIC	unburdened line item cost
PC OH	prime contractor overhead
PC PF	prime contractor profit
BUR LIC	burdened line item cost

TABLE CW3-2

Capital Cost Sub-Element
Decontamination Facility

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas **Date:** 4/28/2003
Checked By: B. Colton **Date:** 5/2/2003

Work Statement:
This sub-element includes portable decontamination facility cost for the decontamination of employees, materials, and equipment for the duration of asbestos removal.

Cost Analysis:
Portable Decontamination Facility

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC		CITATION	COMMENTS
Set Up Portable Asbestos Decontamination Facility Cost	1	EA	1.00	$58.44	$58.44	$13.99	$13.99	$816.39	$0.00	$891.81	$891.81	1.17	1.13	$890.38	15%	8%	$1,117	O	21134045	
Remove Portable Asbestos Decontamination Post Abatement Cleanup	1	EA	1.00	$89.18	$89.18	$20.98	$20.98	$30.82	$0.00	$141.08	$141.08	1.17	1.13	$183.37	15%	8%	$228	O	21134078	
														TOTAL UNIT COST:			$1,345			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
Escalation factor is index from base year of estimate divided by index from year of cost data.
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HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
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P - Based on Previous Work by CDM Federal; V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:

QTY	quantity
EQUIP	equipment
MATL	material
HPF	HTRW productivity factor
ADJ LABOR	adjusted labor for HPF
ADJ EQUIP	adjusted equipment for HPF
UNMOD UC	unmodified unit cost
UNMOD LIC	unmodified line item cost
EF	escalation factor
AF	area factor
UNBUR LIC	unburdened line item cost
PC OH	prime contractor overhead
PC PF	prime contractor profit
BUR LIC	burdened line item cost
EA	each

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.85 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 8% is used for the Prime Contractor

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TABLE CW3-3

Capital Cost Sub-Element
Containment System and Set-up

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/28/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes containment of the building by sealing all openings and providing negative air pressure.

Cost Analysis:
Building Containment and Set-up (2 days)

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC		CITATION	COMMENTS
Seal all openings with polyethylene sheeting	310	SF	0.56	$0.00	$0.00	$0.00	$0.00	$0.10	$0.00	$0.10	$31.02	1.00	1.13	$35.08	15%	8%	$45	R	25 01 0210	
Set up negative air machine, 1000-2000CFM unit, 25 KCF room volume	10	EA	0.55	$59.27	$107.77	$0.94	$1.70	$309.20	$0.00	$418.69	$4,186.85	1.17	1.13	$5,442.64	15%	8%	$6,760	O	21134049	
3 laborers - full time	48	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$1,490.40	1.04	1.13	$1,743.77	15%	8%	$2,166	C	Crew A-11	
3 equipment operators-medium	48	HRS	1.00	$28.85	$28.85	$1.00	$1.00	$0.00	$0.00	$29.85	$1,432.80	1.04	1.13	$1,676.38	15%	8%	$2,082	C	Crew A-3B	
1 foreman - full time	16	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$504.80	1.04	1.13	$590.82	15%	8%	$734	C	Crew A-11	
1 site manager -1/2 time	8	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$252.40	1.04	1.13	$295.31	15%	8%	$367	C	Crew A-11	
														TOTAL UNIT COST:			$12,154			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
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Source of Cost Data:
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Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 8% is used for the Prime Contractor.

Abbreviations:
QTY quantity
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MATL material
HPF HTRW productivity factor
ADJ LABOR adjusted labor for HPF
ADJ EQUIP adjusted equipment for HPF
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UNMOD LIC unmodified line item cost
EF escalation factor
AF area factor
UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost
EA each

TABLE CW3-4

Capital Cost Sub-Element
VCI Bulk Removal

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/28/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes the removal of vermiculite containing insulation by removing interior wall and vacuuming material from interior of wall and attic floor.

Cost Analysis:
VCI Bulk Removal (5 days)

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC	CITATION		COMMENTS
Vacuum Truck and driver	40	HRS	1.00	$40.00	$40.00	$80.00	$80.00	$0.00	$0.00	$120.00	$4,800.00	1.00	1.00	$4,800.00	15%	8%	$5,952	P		
Labor for VCI removal (4 laborers)	160	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$4,968.00	1.04	1.13	$5,812.56	15%	8%	$7,210	C	Crew A-11	
Labor for VCI removal (1 foreman)	40	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$1,262.00	1.04	1.13	$1,476.54	15%	8%	$1,834	C	Crew A-11	
Labor for VCI removal (1 site manager - 1/2 time)	20	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$631.00	1.04	1.13	$738.27	15%	8%	$917	C	Crew A-11	
														TOTAL UNIT COST:			$15,932			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
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MATL material
HPF HTRW productivity factor
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ADJ EQUIP adjusted equipment for HFP
UNMOD UC unmodified unit cost
UNMOD LIC unmodified line item cost
EF escalation factor
AF area factor
UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost
EA each

Cost Adjustment Checklist:

FACTOR	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.86 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 8% is used for the Prime Contractor.

TABLE CW3-5

Capital Cost Sub-Element
Asbestos-Contaminated Soil Removal

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/28/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes removal of asbestos contaminated soil from the perimeter of the building (44 BCY) and the crawl space (96 BCY)

Cost Analysis:
Asbestos-contaminated soil removal. 1 day for exterior removal and 2 days for crawl space removal.

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC		CITATION	COMMENTS
Loosen soil (interior and exterior)	440	BCY	0.65	$0.00	$0.00	$0.83	$1.69	$0.00	$0.00	$1.69	$237.04	1.04	1.13	$277.34	15%	8%	$344	C	2310 480 0020	Includes equipment cost only.
Vacuum truck and driver	24	HRS	1.00	$40.00	$40.00	$80.00	$80.00	$0.00	$0.00	$120.00	$2,880.00	1.00	1.00	$2,880.00	15%	8%	$3,577	P		
Labor for interior soil removal (4 laborers, 2 days)	64	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$1,987.20	1.04	1.13	$2,325.02	15%	8%	$2,888	C	Crew A-11	
Labor for interior soil removal (1 foreman, 2 days)	16	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$504.80	1.04	1.13	$590.62	15%	8%	$734	C	Crew A-11	
Labor for interior soil removal (1 site manager for 1 day)	8	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$252.40	1.04	1.13	$295.31	15%	8%	$367	C	Crew A-11	
Labor for exterior soil removal and replacement (4 laborers, 1 day)	32	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$993.60	1.04	1.13	$1,162.51	15%	8%	$1,444	C	Crew A-11	
Labor for exterior soil removal and replacement (1 foreman, 1 day)	8	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$252.40	1.04	1.13	$295.31	15%	8%	$367	C	Crew A-11	
Labor for exterior soil removaland replacement (1 site manager for 0.5 day)	4	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$126.20	1.04	1.13	$147.66	15%	8%	$183	C	Crew A-11	
Unclassified Fill, 6" lifts, off-site, includes delivery, spreading, and compaction	51	LCY	0.55	$0.00	$0.00	$1.86	$3.38	$5.30	$0.00	$5.68	$441.89	1.03	1.13	$512.58	15%	8%	$637	R	17 03 0423	
														TOTAL UNIT COST:			$10,841			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
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HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
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P - Based on Previous Work by CDM Federal; V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:
QTY quantity
EQUIP equipment
MATL material
HPF HTRW productivity factor
ADJ LABOR adjusted labor for HFP
ADJ EQUIP adjusted equipment for HFP
UNMOD UC unmodified unit cost
UNMOD LIC unmodified line item cost
EF escalation factor
AF area factor
UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost
EA each

Cost Adjustment Checklist:

FACTOR	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

TABLE CW2-8

Capital Cost Sub-Element
Transportation and Disposal

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/28/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes the storage, transportation and disposal of all contaminated material to the asbestos landfill.

Cost Analysis:
Asbestos Contaminated Material Disposal

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC	CITATION	COMMENTS
Transportation fee for Vacuum boxes to landfill	9	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$200.00	$200.00	$1,800.00	1.00	1.00	$1,800.00	15%	6%	$2,236	P	
Asbestos Landfill Disposal, tipping fee	215	CY	1.00	$0.00	$0.00	$0.00	$0.00	$32.00	$0.00	$32.00	$6,895.00	1.00	1.00	$6,895.00	15%	6%	$8,564	P	
														TOTAL UNIT COST:			$10,800		

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
Escalation factor is index from base year of estimate divided by index from year of cost data.
Escalation indices are from Exhibit B-1 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, and http://www.enr.com/features/conEcol/costIndexes/default.asp
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:
O - ECHOS Unit Cost Book 1999, E - ECHOS Unit Cost Book 2000; C - Means CostWorks 2000; F - Means Fac Constr. Cost Data 1999; R - Means Environmental Remediation Cost Data 2001
P - Based on Previous Work by CDM Federal; V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:
QTY quantity — EA each
EQUIP equipment
MATL material
HPF HTRW productivity factor
ADJ LABOR adjusted labor for HFP
ADJ EQUIP adjusted equipment for HFP
UNMOD UC unmodified unit cost
UNMOD LIC unmodified line item cost
EF escalation factor
AF area factor
UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost

Cost Adjustment Checklist:

FACTOR	NOTES
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1996 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 6% is used for the Prime Contractor.

TABLE CW3-7

Capital Cost Sub-Element
Personal Protective Equipment - Demolition

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas **Date:** 4/28/2003
Checked By: B. Cotton **Date:** 5/2/2003

Work Statement:

This sub-element includes Personal Protective Equipment (PPE) and two-way communication radios needed for the duration of building demolition portion of the project. PPE includes disposable coveralls and ear plugs. Assume demolition duration is 3 days.

Cost Analysis:

Personal Protective Equipment - Demolition

DESCRIPTION	QTY	UNIT(S)	HFF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC	CITATION	COMMENTS
Communications																			
Two-Way Radios	6	EA	1.00	$0.00	$0.00	$0.00	$0.00	$80.00	$0.00	$80.00	$480.00	1.04	1.13	$561.50	15%	6%	$698	E 33-01-0420	
Level D PPE																			
Disposal Coveralls (Tyvek)	96	EA	1.00	$0.00	$0.00	$0.00	$0.00	$4.06	$0.00	$4.06	$397.68	1.04	1.13	$465.52	15%	5%	$575	E 33-01-0425	
Disposable Ear Plugs, Pair	96	EA	1.00	$0.00	$0.00	$0.00	$0.00	$0.15	$0.00	$0.15	$14.70	1.04	1.13	$17.20	15%	5%	$21	E 33-01-0429	
														TOTAL UNIT COST:			$1,297		

Notes:

Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
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Escalation indices are from Exhibit B-1 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, and http://www.enr.com/features/conEco/costIndexes/default.asp
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:

NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply
O - ECHOS Unit Cost Book 1998; E - ECHOS Unit Cost Book 2000; C - Means CostWorks 2000; F - Means Fac Constr. Cost Data 1998, R - Means Environmental Remediation Cost Data 2001
P - Based on Previous Work by CDM Federal; V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:

QTY quantity — EA each
EQUIP equipment
MATL material
HFF HTRW productivity factor
ADJ LABOR adjusted labor for HFP
ADJ EQUIP adjusted equipment for HFP
UNMOD UC unmodified unit cost
UNMOD LIC unmodified line item cost
EF escalation factor
AF area factor
UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HFF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 5% is used for the Prime Contractor.

TABLE CW3-8

Capital Cost Sub-Element
Building Demolition

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/28/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes building demolition of wood frame and concrete foundation

Cost Analysis:
Building Demolition (7 days)

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC	CITATION	COMMENTS
Building Demolition, multilevel, steel, nonexplosive - assume wood is approx. same cost	62,660	CF	1.00	$0.00	$0.00	$0.03	$0.03	$0.00	$0.00	$0.03	$2,486.40	1.03	1.13	$2,884.22	15%	8%	$3,582	R 02049 6110	
Foundation demolition, floors, concrete slab on grade 4" thick, reinforced, wire mesh	5,180	SF	1.00	$0.00	$0.00	$0.38	$0.38	$0.00	$0.00	$0.35	$1,886.40	1.09	1.13	$2,401.45	15%	8%	$2,983	F 020 754 0260	
Labor for demolition (3 laborers for 7 days)	168	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$5,216.40	1.04	1.13	$6,103.19	15%	8%	$7,580	C Crew A-11	
Labor for demolition (3 equip. operators for 7 days)	168	HRS	1.00	$28.55	$28.55	$0.00	$0.00	$0.00	$0.00	$28.55	$4,798.40	1.04	1.13	$5,611.79	15%	8%	$6,970	C Crew A-11	
Labor for site demolition (1 foreman for 7 days)	56	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$1,766.80	1.04	1.13	$2,067.16	15%	8%	$2,567	C Crew A-11	
Labor for demolition (1 site manager for 3.5 days)	28	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$883.40	1.04	1.13	$1,033.58	15%	8%	$1,284	C Crew A-11	
Landfill Disposal, wood - transportation and tipping fee	128	CY	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$32.00	$32.00	$4,093.45	1.00	1.00	$4,093.45	15%	8%	$5,084	P	
Landfill Disposal, concrete - transportation and tipping fee	40	CY	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$32.00	$32.00	$1,294.36	1.00	1.00	$1,294.36	15%	8%	$1,608	P	
														TOTAL UNIT COST:			$31,658		

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
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Escalation indices are from Exhibit B-1 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, and http://www.enr.com/features/conEco/costindexes/default.asp
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:
O - ECHOS Unit Cost Book 1998, E - ECHOS Unit Cost Book 2000; C - Means CostWorks 2000; F - Means Fac. Constr. Cost Data 1998; R - Means Environmental Remediation Cost Data 2001
P - Based on Previous Work by CDM Federal; V - Vendor Quote, A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:

QTY	quantity
EQUIP	equipment
MATL	material
HPF	HTRW productivity factor
ADJ LABOR	adjusted labor for HPF
ADJ EQUIP	adjusted equipment for HPF
UNMOD UC	unmodified unit cost
UNMOD LIC	unmodified line item cost
EF	escalation factor
AF	area factor
UNBUR LIC	unburdened line item cost
PC OH	prime contractor overhead
PC PF	prime contractor profit
BUR LIC	burdened line item cost
EA	each

Cost Adjustment Checklist:

FACTOR	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 8% is used for the Prime Contractor.

TABLE CW3-9

Capital Cost Sub-Element
Site Restoration

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas **Date:** 4/28/2003
Checked By: B. Cotton **Date:** 5/2/2003

Work Statement:
This sub-element includes site grading and transportation and disposal costs for building demolition debris.

Cost Analysis:
Site Restoration (1 day)

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC		CITATION	COMMENTS
General labor (3 laborers)	24	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$745.20	1.04	1.13	$871.88	15%	8%	$1,083	C	Crew A-11	
Equipment operators (3 equip. operators)	24	HRS	1.00	$28.55	$28.55	$0.00	$0.00	$0.00	$0.00	$28.55	$685.20	1.04	1.13	$801.68	15%	8%	$996	C	Crew A-11	
Foreman	4	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$126.20	1.04	1.13	$147.65	15%	8%	$183	C	Crew A-11	
Site manager	4	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$126.20	1.04	1.13	$147.65	15%	8%	$183	C	Crew A-11	
Pad subgrade preparation, fine grade structure & slabs with grader	1151	SY	1.00	$0.00	$0.00	$0.65	$0.65	$0.00	$0.00	$0.65	$748.22	1.03	1.13	$867.84	15%	8%	$1,078	R	02512 1100	
														TOTAL UNIT COST:			$3,523			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000
Escalation factor is index from base year of estimate divided by index from year of cost date
Escalation indices are from Exhibit B-1 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, and http://www.enr.com/features/conEco/costIndexes/default.asp
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:
O - ECHOS Unit Cost Book 1995; E - ECHOS Unit Cost Book 2000; C - Means CostWorks 2000; F - Means Fac. Constr. Cost Data 1998; R - Means Environmental Remediation Cost Data 2001
P - Based on Previous Work by COM Federal, V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:
QTY quantity
EQUIP equipment
MATL material
HPF HTRW productivity factor
ADJ LABOR adjusted labor for HPF
ADJ EQUIP adjusted equipment for HPF
UNMOD UC unmodified unit cost
UNMOD LIC unmodified line item cost
EF escalation factor
AF area factor
UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost
EA each

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1995 cost sources - 17% (EF=1.17)
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 8% is used for the Prime Contractor

A

TABLE CW3-10

Capital Cost Sub-Element
Building Construction

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas **Date:** 4/28/2003
Checked By: B. Cotton **Date:** 5/2/2003

Work Statement:
This sub-element includes the overall cost to re-build the store after demolition.

Cost Analysis:
Building Construction

DESCRIPTION	QTY	UNIT	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC	CITATION	COMMENTS
Bldg Construction, Retail Stores, Total project costs	15360	SF	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$38.10	$38.10	$197,356.00	1.00	1.13	$240,778.75	15%	5%	$299,045	F 171 720 0010	
														TOTAL UNIT COST:			$299,045		

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
Escalation factor is index from base year of estimate divided by index from year of cost data.
Escalation indices are from Exhibit B-1 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000, and http://www.enr.com/features/conEco/costIndexes/default.asp
HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Sources of Cost Data:
NA - Not Applicable - costs are from previous work or vendor quote
For citation references, the following sources apply:
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P - Based on Previous Work by CDM Federal; V - Vendor Quote; A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:

QTY	quantity
EQUIP	equipment
MATL	material
HPF	HTRW productivity factor
ADJ LABOR	adjusted labor for HFP
ADJ EQUIP	adjusted equipment for HFP
UNMOD UC	unmodified unit cost
UNMOD LIC	unmodified line item cost
EF	escalation factor
AF	area factor
UNBUR LIC	unburdened line item cost
PC OH	prime contractor overhead
PC PF	prime contractor profit
BUR LIC	burdened line item cost
EA	each

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17).
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 5% is used for the Prime Contractor.

TABLE CW3-11

Capital Cost Sub-Element
Site Breaksown

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas Date: 4/26/2003
Checked By: B. Cotton Date: 5/2/2003

Work Statement:
This sub-element includes cleaning and breaking down equipment following restoration.

Cost Analysis:
Site breakdown (2.5 days)

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC		CITATION	COMMENTS
Labor for site cleaning and breakdown (4 laborers for 2.5 days)	80	HRS	1.00	$31.05	$31.05	$0.00	$0.00	$0.00	$0.00	$31.05	$2,484.00	1.04	1.13	$2,808.29	15%	8%	$3,610	C	Crew A-11	
Labor for site cleaning and breakdown (1 foremen for 2.5 days)	20	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$631.00	1.04	1.13	$738.27	15%	8%	$917	C	Crew A-11	
Labor for site cleaning and breakdown (1 site manager for 1.25 days)	10	HRS	1.00	$31.55	$31.55	$0.00	$0.00	$0.00	$0.00	$31.55	$315.50	1.04	1.13	$369.14	15%	8%	$458	C	Crew A-11	
														TOTAL UNIT COST:			$4,985			

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
Escalation factor is index from base year of estimate divided by index from year of cost data.
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HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
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UNBUR LIC unburdened line item cost
PC OH prime contractor overhead
PC PF prime contractor profit
BUR LIC burdened line item cost
EA each

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 9% (EF=1.09), and 1998 cost sources - 17% (EF=1.17)
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.

TABLE CW3-12

Capital Cost Sub-Element
Replace Inventory

Site: Libby Asbestos
Location: Libby, Montana
Phase:
Base Year: 2003

Prepared By: A. Rassas **Date:** 4/28/2003
Checked By: B. Cotton **Date:** 5/2/2003

Work Statement:
This sub-element includes the cost to replace the inventory within the store

Cost Analysis:
Inventory Replacement

DESCRIPTION	QTY	UNIT(S)	HPF	LABOR	ADJ LABOR	EQUIP	ADJ EQUIP	MATL	OTHER	UNMOD UC	UNMOD LIC	EF	AF	UNBUR LIC	PC OH	PC PF	BUR LIC	CITATION	COMMENTS
Inventory replacement	1	LS	1.00	$0.00	$0.00	$0.00	$0.00	$0.00	$5,000.00	$5,000.00	$5,000.00	1.00	1.00	$5,000.00	15%	6%	$6,210	V	Value to be assessed.
														TOTAL UNIT COST:			$6,210		

Notes:
Area factor is from Exhibit B-2 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000.
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HTRW productivity factor is from Exhibit B-3 or B-4 of "A Guide to Developing and Documenting Cost Estimates During the Feasibility Study", EPA 2000

Source of Cost Data:
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For citation references, the following sources apply:
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P - Based on Previous Work by CDM Federal; V - Vendor Quote, A - Allowance Assumed
L - Average Professional Labor Rates for 2002 (Average Rates Compiled from Various State/Federal Public Contract Sources)

Abbreviations:

QTY	quantity	EA	each
EQUIP	equipment		
MATL	material		
HPF	HTRW productivity factor		
ADJ LABOR	adjusted labor for HFP		
ADJ EQUIP	adjusted equipment for HFP		
UnMOD UC	unmodified unit cost		
UNMOD LIC	unmodified line item cost		
EF	escalation factor		
AF	area factor		
UNBUR LIC	unburdened line item cost		
PC OH	prime contractor overhead		
PC PF	prime contractor profit		
BUR LIC	burdened line item cost		

Cost Adjustment Checklist:

FACTOR:	NOTES:
H&S Productivity (labor and equipment only)	Field work will be in Level "C" and "D" PPE. An HPF of 0.95 is used for labor and equipment unit costs that occur in contaminated areas.
Escalation to Base Year	2001 cost sources are escalated by 3% to 2003 costs (EF=1.03), 2000 cost sources - 4% (EF=1.04), 1998 cost sources - 0% (EF=1.00), and 1998 cost sources - 17% (EF=1.17)
Area Cost Factor	An AF of 1.13 is used for Montana, except an AF of 1.00 (national unmodified average) is used for local vendor quotes.
Subcontractor Overhead and Profit	It is assumed that Subcontractor O&P is either included in the PC O&P or has been factored into vendor quotes or previous work.
Prime Contractor Overhead and Profit	It is assumed that home office OH is 5%, and field office OH is 10%. Profit of 6% is used for the Prime Contractor.

Client:	Volpe	By:	A. Rassas	4/28/2003
Project:	Libby Asbestos	Ck:	B. Cotton	5/2/2003
Project No.:	2603.025.203.RADSN	Rev. By:		
Detail:	Second Hand Store ACM Removal, Demolition and Reconstruction			

Removal of asbestos containing materials

Crew:	1	site manager
	1	labor foreman
	3	laborers
	1	vacuum truck driver
	3	equipment operators
Total	8	laborers

For PPE estimate use workers inside **7**

Task Durations (assumed)

Containment and set-up	2 days
VCI Bulk removal	5 days
Building Demolition	7 days
soil removal	1 days
Breakdown	4 days
Total	**19** days

Area of VCI Bulk Removal

	Width, ft	Height, ft	Area, SF
Attic floor	20	40	800
Walls	19	8	152
	60	8	480
	6	8	48
Total			1480
Add 10% safety factor			**1628**

Square footage-first floor

	Width, ft	Length, ft	Area, SF
Storage	18	20	360
	14	8	112
	14	8	112
	14	12	168
Stairs to attic area	14	12	168
Fire wood storage	10	10	100
Open Area	36	20	720
	25.5	30	765
Bathroom	10	10	100
Approx. desk area and entrance	30	20	600
Additions	35	5	175
	40	5	200
	40	10	400
	80	15	1200
			5,180

Total wall/floor cleaning **6,808**

Installation of containment barrier

	Width, ft	Height, ft	Area, SF
3 doors	2	7	42
15 windows	4	4	240
Total			282
Add 10 % safety factor			**310**

Client:	Volpe	By:	A. Rassas	4/28/2003
Project:	Libby Asbestos	Ck:	B. Cotton	5/2/2003
Project No.:	2603.025.203.RADSN	Rev. By:		
Detail:	Second Hand Store ACM Removal, Demolition and Reconstruction			

Removal of asbestos contaminated soil

Assume that removal of asbestos contaminated soil will have to be done aalong the perimeter of the N, W, and E sides of building (10' wide by 0.5" deep) and underneath the crawl space closest to the RR tracks (1/2 area of building x 1' deep). South side of building is paved

Along perimeter of building

Perimeter, ft	Width, ft	Depth, ft	Volume, CF	Volume, CY
239	10	0.5	1195	44

Underneath crawl space

Area, SF	depth, ft			
5,180	0.5		2590	96
		Total:		**140**

Asbestos landfill disposal volumes

Assume 1/2" thick VCI matl.	Width, ft	Area, SF	Volume, CF	Volume, CY
VCI material	0.5	1628	814	30
Asbestos-contaminated soil				140
Total				170
15% Expansion factor				196
10% Safety factor:				**215**
Vacuum boxes needed				
25 CY boxes				9

Building Demolition

2 story building. Each story is 8' high.

	Total SF	Height, ft	Volume, CF	Volume, CY
Total Volume	5,180	16	82880	**3070**
Concrete foundation	5,180	0.333	1727	**64**

Client:	Volpe	By: A. Rassas	4/28/2003
Project:	Libby Asbestos	Ck: B. Cotton	5/2/2003
Project No.:	2603.025.203.RADSN	Rev. By:	
Detail:	Second Hand Store ACM Removal, Demolition and Reconstruction		

Demo - Volume of material to be disposed

Assume width of wall is 1/2" thick, exterior and interior. Assume studs spaced every 2'
Assume studs are 2x4's.

	Length, ft	Width, ft	Height, ft	Volume, CF
Stud Vol	1/6	1/3	16	0.89

Length, ft.
260

	Width, ft	Length, ft	Perimeter, ft.	Height, ft	Area, SF	Interior wall Width, ft	Volume, CF
Storage	18	20	76	16	1216	0.042	51
	14	8	44	16	704	0.042	30
	14	12	52	16	832	0.042	35
	14	12	52	16	832	0.042	35
Stairs to attic area	14	12	52	16	832	0.042	35
Fire wood storage	10	10	40	16	640	0.042	27
Open Area	36	20	112	16	1792	0.042	75
	25.5	30	111	16	1776	0.042	75
Bathroom	10	10	40	16	640	0.042	27
Approx. desk area and entrance	30	20	100	16	1600	0.042	67
Additions	35	5	80	16	1280	0.042	54
	40	5	90	16	1440	0.042	60
	40	10	100	16	1600	0.042	67
	80	15	190	16	3040	0.042	128
			1139		18,224		**765**

Exterior wall perimeter = 35 +5 +18 +15+80+75+84 = 312

Perimeter, ft	Height, ft.	Width, ft	Volume, CF
312	16	0.042	**210**

Assume 1/2 the wall perimeters to account for adjacent walls.

# of Studs	Total perimeter dist * 0.5(ft):	570 ft	
	1 stud per 2 ft.	285	
		Stud volume(CF):	**253**

	Total, SF	Thickness, ft	Volume, CF
Ceiling	5,180	0.167	**865**
Floor foundation	5,180	0.167	**863**

Total Vol., wood only (CF):	2,093
Total Vol. (CY):	78
Add 50% expansion factor:	116
Add 10% safety factor:	**128**
Total Vol. Concrete ony:	863
Add 15% expansion factor:	993
Add 10% safety factor:	**1092**
Total Vol. (CY):	**40**

Site Grading
twice the area of bldg.

Area, SF	Area, SY
10360	1151